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Article in *SSRN Electronic Journal* · March 2012

DOI: 10.2139/ssrn.2030610

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## **A Study of Fodder Value Chain in Bihar (India)**

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### **Abstract**

The study has explored the intricacies of fodder value chain in Bihar. It has found that paddy straw and wheat *bhusa* (Wheat straw) are the major fodders that account for about 95 per cent of the total marketed fodder in Bihar. Mainly four types of fodder supply chains have been identified. It has been observed that about 10 per cent of fodder is traded directly across the producers and animal rearers. This type of transaction is localized and often practised within the same village or nearby villages. Trader-I has been identified as the bullock cart owner, vendor or other small assembler, Trader-II is the wholesaler, and Trader-III is the retailer, who sells to the ultimate user. The agent facilitates trading by providing his services in lieu of some commission charges. The study has reported that fodder gains up to 240 per cent value in the process of transaction from the farm producers to ultimate consumers. Transportation is the major activity that accounts for about 36 per cent in total cost addition. Lack of storage facilities, policy environment and other institutional support like access to credit have been identified as the major constraints

**Key Word:** Fodder Value Chains, Fodder marketing

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## **Introduction**

Changing land use pattern with intensive and commercialized agriculture and development activities have been affecting livestock rearing pattern from grazing to stall feeding due to sharp decrease in forest area, fallow and grazing lands, however, increased income and rapid urbanization have accelerated the process of commercialization in dairy sector. Changes in the pattern of livestock rearing are therefore creating huge demand for fodder and concentrates. Scarcity of feed and fodder is one of the most serious impediments in the way of sustainable livestock development, which has direct bearing on the income and livelihood of numerous resource poor livestock keepers. Availability and access to quality fodder resources is emerging as an important constraint in livestock production (Hall et al. 2008). Birthal and Jha (2005) estimated that unavailability of dry and green fodder respectively accounted for 11.6 percent and 12.3 percent losses in dairy milk production in India.

Availability of green fodder round the year is a serious challenge for the livestock keepers because a majority of the livestock keepers are small holders who are unable to produce and store livestock fodder and concentrates in bulk and therefore face acute shortage during certain periods. The state has 27.16 million livestock that constitute 5.6 percent of the India's total livestock population (Livestock census, 2003). The estimated annual requirements of concentrates, dry fodder and green fodder for the livestock in Bihar are 5.9 million tonnes, 24.8 million tonnes and 38.2 million tonnes, respectively. In contrary the state is able to meet only 85 percent of its requirements of dry fodder and 4.4 percent of green fodder. (Eleventh Five Year Plan). About 80 percent of the cost of milk production depends upon the cost of feeding (DAHF, Govt of Bihar). It clearly shows the importance of animal feeding in milk production, of which fodders (dry and green) assume significant importance.

Fodder is defined as the wide range of crop and pasture species that are grown, harvested and lightly processed to facilitate both on-farm use and domestic trade. These include grass, legume and tree species as well as crop residues. Three major sources of fodder supply are crop residues, cultivated fodder and fodder from common property resources like forests, permanent pastures and grazing land. The area under cultivated fodder crops in Bihar in 2005-06 was close to 15 thousand hectares that accounted for only 0.19 percent of the total cropped area. The latest available data pertaining to 2005-06 also reveals that in Bihar, cultivated area, forests, and permanent pastures and barren and uncultivable land together

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produced only a paltry sum of 1.3 million tonnes of green fodder (DAC, BAHS 2004). The production of dry fodder also has been more or less constant since 2000-01. Between 2000-01 and 2005-06, annual production of dry fodder was found to be fluctuating between 1.95 to 2.10 million tonnes.

Therefore, in recent years Government of Bihar has accorded high priority to agriculture and livestock development. It has launched a concerted programme to raise the livestock productivity by increasing availability of quality fodder in the rural areas. To achieve this goal mini kits of improved and high yielding fodder seeds are being distributed in the state.

However, the gap between demand and supply of green fodder has been remarkably wider and there has been a distinct pattern between these gaps of dry and green fodder. Gap between the demand and supply of dry fodder has narrowed down in the recent years whereas this gap has remained static (about 96 to 97%) for the green fodder. This implies that hardly 3 to 4 percent of the state's green fodder requirement is addressed with the domestic production. This indeed is a matter of serious concern, as it affects the dairy development in Bihar to a large extent and thus requires immediate attention for increasing its supply.

It is, therefore, imperative that entire fodder value chains must be able to deliver sufficient quantity of quality fodder to the consumer in more efficient and innovative ways than the value chains in competing markets. It is also necessary that the fodder value chains and the roles of various actors across these chains be identified and understood properly to mitigate the scarcity of fodder and enhance the efficiency and efficacy of fodder value chains. There is little information regarding the feed and fodder situation in Bihar, as no systematic study has been done in past. The present study, attempts to understand the intricacies of fodder value chain in Bihar. It explores the structure and linkages of markets to alleviate fodder scarcity, particularly for the poorest and landless sections of the society, who have very limited ability to produce their own fodder, but need to access quality fodder at reasonable price to produce economical livestock products.

### **Approach and method**

Recurring floods and changing cropping patterns have created two distinct zones in Bihar; so far as the fodder availability is concerned, while northern part is generally deficit in fodder availability and the southern part is mostly surplus zone particularly in terms of dry fodder. The present paper is based on the information elicited through Rapid Appraisal (RA) conducted at 31 locations in 4 districts of Bihar with the help of semi-structured schedules.

Five different types of checklist, one for each of the different type of actor of fodder markets namely producer, consumer, trader, miller, and commission agent were prepared and used for conducting RA to draw overall idea about the fodder marketing in Bihar. RAs were conducted in 4 districts, namely Patna and Jahanabad in fodder surplus zone and Vaishali and Begusarai in fodder deficit zone. Fodder surplus and deficit zones were delineated on the basis of discussions with the State Government Officials and Scientists of the Rajendra Agricultural University, Bihar. It was agreed upon that fodder surplus zones could be defined as the territorial regions, which are generally self-sufficient in fodder production and are net exporters of fodder. Similarly, deficit zones could be defined as the areas which are dependent on other regions for their feed and fodder requirements.

### **Results and discussion**

The results indicate a distinct pattern of livestock feeding which is by and large common in all parts of Bihar. Crop residues and by-products are the key components of livestock feed. Dry fodder constitutes largest proportion of the forage. It emerged that about 82 percent of the feed requirement is met by the dry fodders. Straws of paddy and wheat are the two most important dry fodders which are fed to the livestock. These together contribute to about 95 percent of the dry fodders consumed by the livestock in Bihar. There are other forages too, whose dried parts (stems and leaves) are used as the animal feed. For instance, small quantities of beaten straws of some of the leguminous crops like lentils, green gram, red gram, lathyrus, etc, are mixed with other fodder while feeding the livestock in some of the areas of Bihar like *Tal* and *Diara*. Maize stover also assumes significant importance in the maize growing areas of Bihar, where it is used as a common fodder for feeding the livestock. The proportion of green fodder in total livestock feed remains close to 10 percent. About 55 percent of green fodder are cultivated. Maize, sorghum, oats, berseem, napier grass, and some of the legume species are mostly cultivated to meet the green fodder requirement of the animals. Stovers of green maize and sorghum accounts for about 30 percent of the total green fodder particularly in maize growing areas. Some specific green fodder crops like berseem and napier grass are also cultivated and these constitute 20 percent of the green fodder. Cut grasses, weeds and rogues are also potential sources of green fodder in the state.

### **Marketing of fodder**

There is a significant level of trading of dry fodder, particularly, *Bhusa* (wheat straw), *pual* (un-chopped paddy straw) and *Kutti* (chopped paddy straw) at village, district, state and inter-state level.. It is important to note that there are fodder surplus areas in deficit zones and likewise surplus zones also have many fodder deficit regions. But in general, fodder surplus zones produce fodder which is in excess of the internal demand of the regions and therefore these are the major source of supply of fodder in the deficit zones.

Fodder marketing in Bihar is absolutely unorganized and deprived of any institutional support. Paddy and wheat straws are the major traded fodders. Almost whole of the fodder trade revolves around the marketing of these two. Green fodder is also traded but its proportion is quite insignificant. With the commercialization of dairy sector and rearing of high yielding animals concentrate market has emerged in a big way. Both formal and informal markets operate in this segment.

### **Actors of fodder trade**

Fodder marketing involves a number of actors across the supply chain. As usual a normal supply chain begins with the fodder producer and ends with the ultimate user. Different types of supply chains were identified during the RA. The most common fodder supply chain begins with the producers and proceeds further in different ways with the help of various kinds of actors such as assemblers and small vendors, commission agents, retailers, wholesalers and processors and ends with the ultimate users who are scattered across the state.

### **Common fodder supply chains**

Mainly four types of fodder supply chains were identified. As conventional chains, the shortest chain existing was found to be between the producer and the consumers. It was found that about 10 percent of fodder is traded directly between the producers and animal rearers. This type of transaction is localized and often practiced in within the same village or nearby villages Different types of fodder supply chains and volume of fodders traded are shown in figure 1. Trader-I is identified as bullock cart owner, vendors or other small assemblers, Trader-II is wholesaler and Trader III is the retailer, who sells to the ultimate consumers. Agent facilitates trading by providing his service in lieu of commission charges.

The next of type of supply chain that is common for *Kutti* (chopped paddy straw) involves producer, trader-I and Trader-III before reaching to the ultimate consumers. It depicts that

about 60 percent of the marketed surplus reaches in the fodder market from the producer by the Trader-I.

Trader-I involves bullock cart owner, vendors and other small assemblers who contact the producer and procure fodder from them. There are many retailers who maintain good contacts with the producers and purchase fodder directly from them. The wholesalers are shown in figure-1 as Trader II. Trader II procures 30 percent of fodder sold by the producers directly from them. Producers supply 10 percent of their marketable surplus to the consumers or ultimate users. The longest supply chain involves producer, Trader I (explained above), Trader II (also defined above), Commission agents, Trader III and finally the ultimate consumers. Trader III (retailer) sells to the ultimate consumers. Commission agents are those who provide their services in lieu of certain charges.

The largest purchaser of fodder from the Trader I is Trader II. Trader I, sells 50 percent of their purchased fodder to Trader II (wholesaler), 30% to the Trader III (retailers), and 20 percent to the ultimate consumers. Trader II operates with the help of commission agents who dispose 70 percent fodder of the Trader II. Remaining 30 percent of the fodder with the Trader II is sold directly to the Trader III and the consumers. Commission agents route 80 percent of their volume of business via Trader III (Wholesalers & other big traders). Consumers too contact commission agents and buy fodder with their help. Commission agents channelized remaining 20 percent of the fodder in the hands of consumers.

### **Value addition**

Fodder in Bihar gets value added at different stages starting from purchase and collection from the producers reaching at the final consumers. Different stages of three most common fodder value chains are shown in table 1. Fodder movement through different chains have been shown below:

#### **Chain –I: Chopped paddy straw**

**Producer→Trader II→ Trader III→Consumer**

#### **Chain-II: Chopped Paddy straw**

**Producer→ Trader I → Trader III → Consumer**

#### **Chain-III: Wheat straw**

**(Producer→ Trader II → Agent → Trader III → Consumer**

**Table 1: Common fodder value chains related to wheat and paddy fodders in Bihar.**  
(Rs/q)

Sl. No.	Particulars	Chain –I	Chain-II	Chain-III
		Jahanabad to Ranchi	Patna to Patna City	Masaurhi-Patna-Hajipur
1	Producers' price	125	125	150
2	Collection	20	15	13
3	Chopping	25	25	0
4	Bags	20	-	20
5	Loading	10	3	3
6	Transportation	140	71	60
7	Other charges	16	9	4
8	Commission agents	6	-	6
9	Weighing	2	4	3
10	Unloading	6	4	5
11	Total cost of Trader I	-	2277	
12	Total cost of Trader II	370	-	264
13	Profit margin of Trader I	-	21	-
14	Profit margin of Trader II	25	-	20
15	Per Quintal purchase Price of Trader III	395	298	284
16	Profit of Trader III	30	28	16
17	Consumers' price	425	326	300

Chain-I represents the inter-state fodder trade between Bihar and Jharkhand. It is obvious that the value of fodder (chopped paddy straw) increased by 240 percent due to various stages of operations and the associated profit margins. Chain-II represents the shortest value chain of chopped paddy straw that is much localized and happening within the same region. It is, generally, practiced by the small vendors, assemblers, petty traders who often own bullock cart, horse cart or rickshaw. Chain-III shows the fodder value chain covering wheat straw. This chain is operational between fodder surplus and fodder deficit zones in Bihar. There is an obvious preference for wheat *bhusa* in the fodder deficit regions of north Bihar and therefore most of the wheat straw is marketed in the fodder deficits regions of north Bihar. During the process of marketing of wheat *bhusa* from the door step of producer to reaching at the final consumer a value addition of 200 percentage point was reported. Value addition takes place because of involvement of different sets of activities in the fodder value chains.

Collection, chopping, loading/unloading, weighing, *etcetera* are some of the activities that matter in the fodder value chains but it is the cost that really matters.

Transportation of fodder from the production centres to the markets is also extremely inconvenient and involves huge transportation and transaction costs, due to poor road conditions in the rural areas. It is estimated that marketing of one quintal of fodder added upto 68 percent cost in the producer's price of fodder. The highest cost item is transportation cost which accounts for about 36 percent. To avoid harassments by the government machinery a handsome amount of money (4%) is paid as bribe to various Government personnel (traffic police, octroi and tax, etc.).

Various modes of transport used in fodder marketing also determine the added cost. For localized fodder and concentrate trades (< 10kms) mainly bullock carts are used. A bullock cart load of wheat *bhusa* fetches a price of between Rs. 1200-1500 and roughly weighs 4 to 5 quintals.

Tractor trolleys are also very important for fodder transportation. About 10 to 15 quintals of wheat/ paddy straw is loaded on a tractor trolley, which is sold in the peri-urban markets. The tractor trolleys transport fodder (wheat *bhusa*) using bamboos or specially designed structures covered with gunny bags. The tractors plying with huge amounts of fodder can easily be seen on the National Highways or city roads in Bihar.

Fodder loaded trucks cover relatively long distances. Most of the inter-state and inter-regional trade is accomplished by the trucks. A truck load of wheat *bhusa* accommodates 20-25 quintals and covers distant markets. The truckers purchase fodder from the farmers and petty traders of surplus regions of South Bihar and Eastern Uttar Pradesh and transport and sale it in different fodder deficit regions with the help of commission agents.

Both weighing and measurement by volume are practiced in the fodder trade. Weighing added about Rs.2 to 4 to the cost of a quintal of fodder. Usually sale and purchase of rice straw and wheat *bhusa* at the farm level are done on the basis of volume. The quantity of fodder is determined as per the lot size, size and number of small bundles; and truck/ cart load. The method of weighing is also practiced where facilities are available.

### **Constraints of feed marketing and suggestion for improvement**

Fodder and concentrate markets in Bihar face several constraints. Many of these constraints are generic in nature and need to be addressed to the extent possible. Difficult storage and lack of appropriate storage facilities seriously affect round the year availability of fodder.

Most of the marketable surplus of fodder is generated by the marginal and small farmers, who are in majority in the state but they have limited storage capacity. Due to difficulties in fodder storage they are forced to sell it immediately after the harvesting. Even if it is stored a large proportion of fodder gets spoiled or destroyed due to improper storage facilities.

There is no policy environment for regulation of fodder marketing in the state. Institutional supports like credit facilities, technology and fodder processing facilities, are also lacking. Exploitation of producers by the fodder traders and agents is also very common. Many a times fodder is purchased on credit and payments are delayed extraordinarily or only a part of payment is made and farmers are convinced to forgo remaining amount. There are other difficulties too.

Inadequate supply of fodder, low profit, inadequate capital, unorganized market, lack of any dedicated marketing place are some of the other critical problems that impede the growth of fodder marketing in Bihar. Many of these problems are difficult to address but some of these can be effectively addressed.

## **Conclusions**

Livestock is an integral part of rural economy in Bihar and fodder is a critical input for livestock development. Data show that there exist a huge gap between demand and supply of fodder (both dry as well as green). In order to promote fodder production and requirement it is imperative for the Government to come forward and develop fodder storage facilities at different locations in different regions, so that farmers could store fodder to ensure its availability throughout the year. Due to lack of adequate storage facilities and space producers are forced to dispose the fodder in excess of their marketable surplus and therefore many times marketed surplus exceeds the actual marketable surplus in this way.

Institutional support in the form of credit and creation of fodder banks, particularly in form of fodder bricks in different fodder producing as well as deficit areas for maintaining buffer stock is essential. Fodder markets are highly unorganized and informal and the role of public sector/govt. in its marketing is virtually negligible. Most of the fodder markets do not have any dedicated market place and are operating along the roadsides and have no legal credentials. This becomes one of the reasons of exploitation of people who are involved in

this business. It is envisaged that establishment of dedicated and legal market places would help fodder trade a great deal and also check corrupt practices and exploitations of poor producers and traders.

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**Fig: 1. Flow of fodder transaction by different actors in Bihar**

